Name Yasemin Arsoy

Towel Testing

Purpose: To practice the skills used to design experiments

Problem: Many brands of paper towels claim that they are the strongest. Research is needed to determine which brand of paper towel really is the strongest.

Background Information: Since paper towels are usually wet when they are being used, the "wet strength" of the towel is important. Wet strength is the strength of paper when it is wet. This can be measured by the amount of mass that a wet paper towel can hold.

A-42/45 93%

The Task: To design an experimental investigation (a fair test) to test the strength of three different brands of paper towels. You will have these materials to conduct the experiment:

3 Brands of paper towels	1 ball Jar <small>graduated cylinder rubber band</small>	Water
Graduated cylinder	Pennies <small>Tiles</small>	Triple Beam Balance

Step 1: Identify the **INDEPENDENT VARIABLE** [*what you will change, or the difference between the groups*], the **DEPENDENT VARIABLE** [*what you will observe and measure, the data that you will collect*], and all of the **CONTROLLED VARIABLES** you can think of [*all of the variables that could change, but won't*].

✓ **Independent Variable:**

the type of paper towel

✓ **Dependent Variable:**

the mass of the tiles

✓ **Controlled Variables:**

type of water - tap water
the amount (size) of the paper towel

amt. of H₂O = 1

Step 2: Write a RESEARCH QUESTION using *affect* or *effect*.

How does the brand of the paper towel, effect the amount of mass it can hold (strength)

Step 3: Write a HYPOTHESIS that shows the expected *relationship* between the variables. Use an IF, THEN statement.

If the brand is more expensive then the more mass it can hold.

which one? |

Step 4: Design an EXPERIMENTAL INVESTIGATION to *test your hypothesis*.
Decide:

✓ What your specific independent variables are:

- Recycled Imported Paper towel • Flora
- Zeina
- Mardi Gras

✓ What you are going to observe and measure:

We are going to observe + measure the strength of the paper towel.

✓ How you will do the measuring:

By putting a 7x7cm piece of paper towel over the 500ml beaker, securing it with an elastic band. Then adding 2ml of tap water in the centre of the paper towel. Then we will add 1 tile at a time in the centre of the wet paper towel. Then measure the tiles on scales

✓ How many trials you will have:

3.



Step 5: Write the **PROCEDURE** you will follow during your investigation, *step-by-step*.

1. Equipment
500ml beaker measuring scale
10ml graduated cylinder
tiles
2. tap water
Flora, Noradigraas, recycled and Zebra paper towel (16 x 16cm).

1. Get equipment - above.
2. Put the paper towel over the beaker and secure it with a rubber band.
3. Get the 10ml of water and pour it onto the centre of the paper towel.
4. Gradually add the tiles one by one until the paper towel breaks.
5. Collect all the tiles and measure the mass of the tiles with the scales.
6. Record your findings. *change the brand of paper towel*
7. Repeat each experiment 3 times.

20

✓

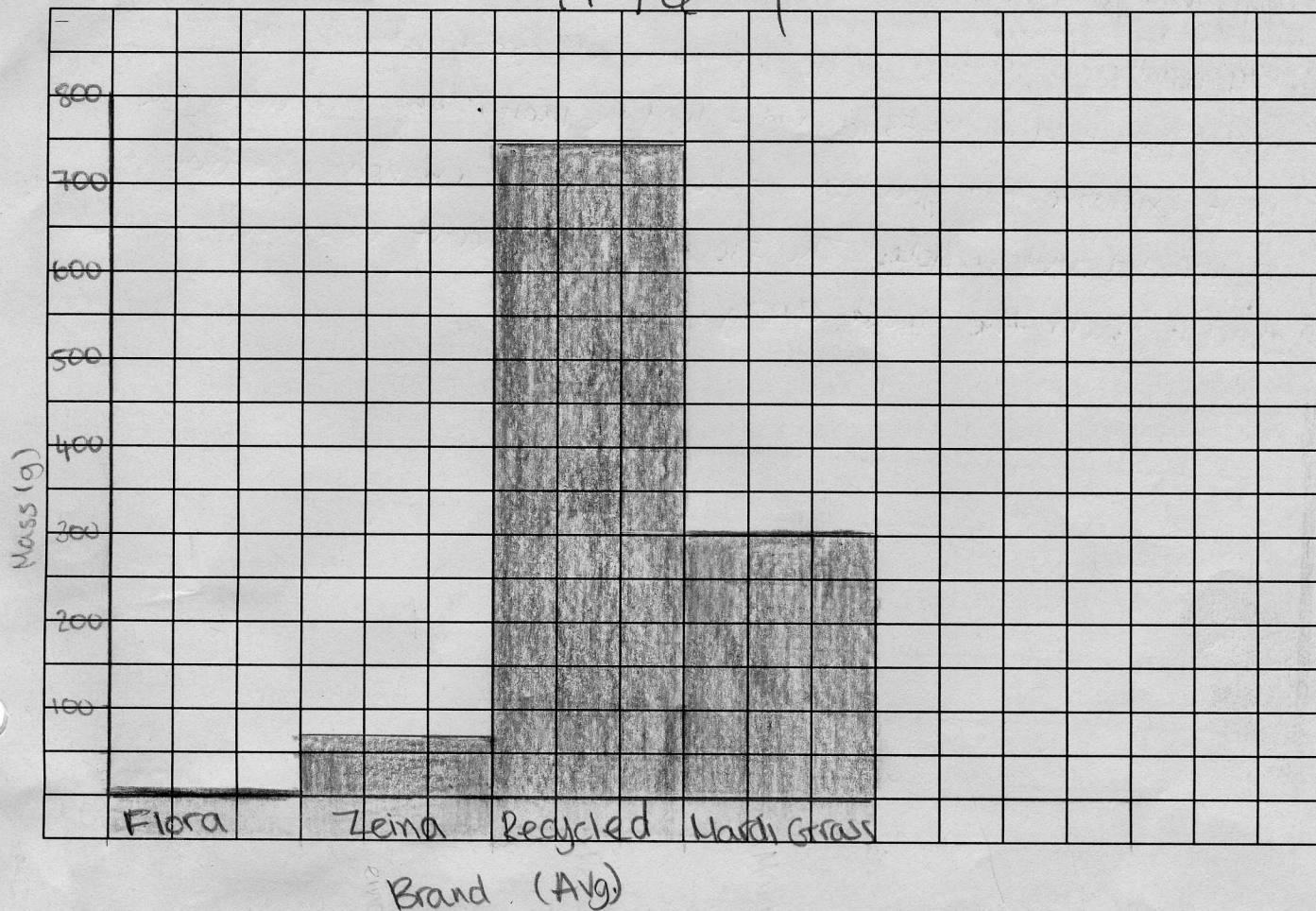
Step 6: Make the **DATA TABLE** to record your data. Include a place for your *reduced data & measures of central tendency* [average].

Towel	# of tiles Mass (g)	# of tiles Mass (g)	# of tiles Mass (g)	Total (g)	Average (g)
	Trial 1	Trial 2	Trial 3	~~~~~	~~~~~
Zeina	14 73.9g 2	14 73.9g 2	13 71.3g 2	219.1g	73.03g
Flora	9.9g 102	10.01g 92	10 45	29.91g	9.97g
Mardi Grass	365.8g 97	353.7g 100	341.9g 90	1061.4g	353.8
Recycled	744.9g	750.7g	740.7g	2236.3g	745.43g

Step 7: Make a **GRAPH** of your reduced data. Remember **DRY MIX** and **TAILS**. Explain what type of graph you will use and why.

I will use a bar graph because you can see the results clearly.

Title - 1



Step 8: ANALYZE your data: What story does the graph tell? What do you know about the effect of the independent variable on the dependent variable?

The effect of the independent variable is different, depending on which dependent variable it is. The graph shows that the Recycled paper towel holds the most mass and the Flora holds the least mass.

Step 9: Write a CONCLUSION. Answer your original questions. Accept or reject your hypothesis. Use actual data [real numbers] to provide evidence for what you say.

My conclusion is that my ~~h₀~~ hypothesis was correct because the recycled paper towel is \$3.53/roll and it held the most (745.43g) and is the most expensive. But you can debate that it is expensive because it is imported and recycled. The Flora was the least expensive \$1.50/roll and it held the least, 9.97g.

✓